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Social Sciences and Humanities
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sciences humaines du Canada

Canada

OBJECT LESSONS IN THE NURSERY.

BY ETHEL R. LUSH,

Organizing Mistress to the Ipswich School Board; Head Mistress of the Ipswich Higher Grade Girls' School.

III. SOME FORMIDABLE PLANTS.

[WANTED: A complete plant of the *Thistle* in flower; a *Teasel,* with leaves, stem and flower-head; a specimen of *Common Butterwort,* a book of blue litmus paper, a small piece of lean meat, a little vinegar, hydrochloric acid (spirits of salt), pepsin-solution, rennet and new milk; a specimen of the *Sundew,* and small cubes of hard-boiled white of egg.]

You have heard of formidable animals, with strong sharp teeth and cruel claws, but that plants can be formidable too, is, perhaps, a new and astonishing idea. I think I can show you, however, that some plants are as cruel and relentless in their way as the wildest of wild beasts in theirs. Pick up a *thistle* and look at it. It is, perhaps, not a very deadly plant, yet it can be, and is, very obnoxious to its enemies. Notice its handsome, soft, purple flowers, and its truly magnificent leaves. Notice too, its terrible prickles; the leaves are outlined with long sharp points, the stem presents fixed bayonets, and even the soft flower-head is studded with a perfect regiment of bristling spikes. The thistle is a veritable fortress, armed on all sides.

You may imagine how much it is feared by animals which might otherwise destroy it. The cattle grazing in the meadow, having once found out the sharpness of its points, leave it undisturbed. The jelly-like snail, which does so much damage to many of our garden favourites, dare not brave its bristles. Small creeping insects, losing themselves amongst its forests of prickles, are glad to escape with their lives. The donkey is, I believe, the only animal who can successfully attack the truly formidable thistle.

No wonder that thistles are common flowers when they are so well able to protect themselves from injury.

But having noticed the sharp side of the thistle, let us see if it has not also a soft side. Look at the cushiony head of

flowers. Run your finger over its surface—how delightfully soft it is to the touch. There are no multitudinous prickles here. Instead, every one of the tiny tubes is filled with sweet honey—pull out a flower and taste for yourselves. Are you surprised that bees, flies and moths find it pleasant to visit the thistle? They fly high and see nothing of the sharp cruel prickles, or if they do they avoid them; and the flowers form a soft cosy bed, in which they can rest in comfort. Sometimes these insects even go to sleep in the flower-head, and when it shuts up for the night like all other respectable flowers they are willing prisoners till dawn.

You must not imagine that the thistle does all this for nothing. Look carefully at the flowers again—there are scores within one head—and you will find a soft powder called pollen, which is used in a way you will learn about later, to further the spread of the flower. When the insects fly away from the thistle some of the pollen sticks to their legs and wings and is carried away to the next flower they visit, and in this way thistles are multiplied.

How interesting it is to find that the thistle, though cruel to its enemies, furnishes food and shelter to its friends.

The next plant to obtain our notice is even more formidable in fact than in appearance. This is a *teasel.* Look at the stem studded with short, sharp prickles, the circle of stiff, pointed leaves which surrounds the flower-head, and last, but not least, the beautiful oval of the flower-head itself. It is strange to find that the flowers are embedded in, and separated from each other, by long, bristly spines, for even the prickly thistle has a soft mass of flowers you remember. The teasel is even less likely than the thistle to be attacked by insect or animal.

But this is not all. Look down the stem to the point where the leaves are attached. What do you observe there? The leaves are placed exactly opposite to each other, and are so wide at the base as to form a cup which surrounds the stem. Put a drop or two of water into this cup, and you have made a tiny moat all round the stem. It is easy to realise that when rain falls water collects in the little cups formed by the leaves, and creeping insects which have braved the prickles of the stem, reach the leaves only to be drowned in trying to pass through the water.

You would naturally think that the teasel would be satisfied in having taken the life of its enemies; but no, it even goes so far as to suck their blood. The bodies of the poor insects soak in the water which drowned them until a thin kind of soup, or meat extract, is made, and into this the teasel dips slender filaments which suck up the nourishment.

Another of these insect-eating plants is the *butterwort*, which grows only in bogs and hilly districts, and for that reason, is not always easy to obtain. Notice first the fibrous root which fastens the deadly little plant into the ground. Then, travelling upwards, count the leaves (there are generally about eight); observe how they are arranged round the stem in a rosette, neatly tucked in at their bases, but spreading outwards in all directions. Rising from the cluster of leaves we find the long, slender stems each bearing a small purple flower.

But it is the *leaves* of this plant which are so especially interesting. Look at them again and notice their frosted appearance. This is due to numerous small glands which are found on the upper surface of the leaf, and it is these glands, or rather the fluid they secrete, that give to the butterwort its deadly properties. Some of the larger leaves, you will observe, are folded over the edge, and when I put this tiny fly upon a younger leaf the edge immediately curls over in the same way and holds the fly in safe-keeping. As soon as the insect touches the leaf the glands send out a fluid which, after a short time, turns acid and dissolves the soft parts of the insect, just as the acid juice in the stomach dissolves lean meat.

Perhaps I can make this clear to you by the help of one or two experiments. Into a glass vessel I put some very small pieces of lean meat, and pour over them an acid fluid resembling that of the stomach (hydrochloric acid and pepsin-solution). From time to time I shall stir the mixture well, and at the end of four or five hours we shall find that the meat is completely dissolved. This is what happens to certain kinds of foods in the stomach. Now take one or two tiny pieces of meat and put them on a leaf of the butterwort. The edges immediately curl over, and if we wait patiently we shall find that an acid fluid issues from the glands, and in time, makes the meat quite soft and transparent.

How do we know that the glands send forth this acid fluid? Here is a little book made up of narrow strips of dull blue paper—called litmus paper. Tear off a strip and soak it in vinegar; it at once turns red, because vinegar, as you know, is an acid. Tear out another strip of blue litmus paper and press it upon one of the unused leaves of the butterwort; no change of colour occurs; but when we remove the paper and press it upon the leaf which is dissolving lean meat, we find that it turns red just as when vinegar was poured over it, thereby proving that an acid fluid is concerned in dissolving, or digesting, the insects upon which the plant feeds.

Let us look now at our captured fly—it is a poor, little, shrivelled-up creature, for all the time we have been talking, the leaf has been engaged in absorbing all the parts of its body that could be dissolved.

Would you like to know how the butterwort gets its name? If you add a few drops of rennet to a dish of new milk which has been slightly heated, you will find that the milk divides into two parts—a thick creamy solid curd and a thin watery liquid. Drop a little rennet upon a strip of blue litmus paper, and the red colour which results proves that rennet is an acid liquid. Now if instead of using rennet, we were to boil some leaves of the butterwort with new milk we should find it thicken and curdle in much the same way; in fact the peasants of Switzerland and other mountainous countries where the butterwort grows freely, have long put it to this use, hence the name *butterwort*.

Another insect-eating plant which grows in England is the *sundew*. Like the butterwort it grows in wet and boggy places and in mountainous districts; in the neighbourhood of Grasmere and indeed in many parts of the Lake district it is found freely.

There is little difficulty in determining how the sundew gets its name, for as I hold it in the sunlight the small red-tinted leaves sparkle as though frosted with diamonds. Like the butterwort it has a fibrous root which fastens it but loosely in the ground; then comes the rosette of beautiful leaves and from the middle of these the smooth, wiry, slender flower-stalks rise, bearing on their curled ends several tiny, pale flowers, which only open when the weather is bright and the sun shining.

Here again it is the leaves which possess the dangerous power of fascination. Observing them with interest we find that they are shaped something like a small round salt-spoon with a long handle. The leaves themselves are green, but are so covered with red hairs as to have on the whole a reddish appearance. The hairs, you observe, are longer towards the edge of the leaf than they are in the middle, and each one is tipped with a drop of clear sticky fluid which gives to the plant the sparkling appearance which gained for it its beautiful name.

But the shining drops have more to do than merely look handsome. Attracted by the sparkling dew, as they take it to be, hapless insects alight on the spoon-shaped leaves and their doom is sealed.

Let me show you how the innocent-looking sundew treats its captives. Instead of a fly I will put a very small piece of hard-boiled white of egg upon a leaf. Immediately all the hairs or tentacles which have been touched by the food bend inwards towards the middle of the leaf and fasten their prize down as though bound by many cords. You may imagine how the sticky fluid hampers a struggling fly, and how it becomes entangled in the numerous tentacles. As in the case of the butterwort an acid fluid is poured forth, and in the course of time, the white of egg will be completely dissolved. Apply blue litmus paper to the leaf and we shall find that it turns red, owing to the acid which is engaged in the work of digestion.

If you are inclined to think that the sun-dew and butterwort are cruel little plants, you must remember that they live in watery places and can draw up through their roots little else but water, so that were it not for their power of digesting and absorbing the nourishing parts of flies they would fare very badly for food.

I should like to tell you about the curious fly-trap which grows in North Carolina, and the great pitcher plant of the East Indies, but perhaps you will go one day to Kew Gardens and see them for yourselves.

[NOTE.—In practice it will probably be found that the matter given above is sufficient for two, or even three lessons.]

CORNELIA MATER GRACCHORUM.

A POEM.

By the Rev. J. Hudson, M.A.

There dwelt at Rome, when times were rude and wild,
Cornelia, mother of the Gracchi; child
Of that great Scipio of immortal fame,
Who took from Afric's fall his martial name.

Her sire's sole darling she had early wed
Titus Sempronius Gracchus, loyal Head
Of Rome's most loyal house, to whom she bare
Twelve sons of promise, and one daughter fair.
But ere the first-born grew to man's estate
She wept a widow. Soon a darker fate
Dealt devastation, and she mourned bereft
Of one and yet another, till were left
Two sons alone: ah! what supremest care
And sweet solicitude upon the pair
She lavished, recking nought of toil or pain,
For all her hopes were centred on the twain.

She might, if such her choice, have called her own
A crown, a sceptred share of Egypt's throne,
But wished no second nuptials; all intent
To mould her sons to mould the state; nor lent
Aught else a transient thought; and, since she saw
Greece eminent in arts and cultured lore,
Sought from her foremost sages teachers grave
To make her lads like-minded, wise and brave;
Cumae and Mitylene send their best,—
And oft at even ere they went to rest,
Herself would tell of deeds of olden fame,
And they would lisp from childhood each great name—
Stern Cincinnatus of the strong right arm,
Twice hailed Dictator from his frugal farm;
Camillus, who in hour of direst need
From Gaulish fetters groaning Romans freed;
The self-devoted Decii, son and sire,
And Scaevola unflinching at the fire.

So were they taught from youth to emulate
All high examples; with the good and great
For valour's meed and virtue's palm to vie,
To dare brave deeds, or in the daring die:
To be Rome's champions and their country's stay,
Fearless and faithful in the evil day.